

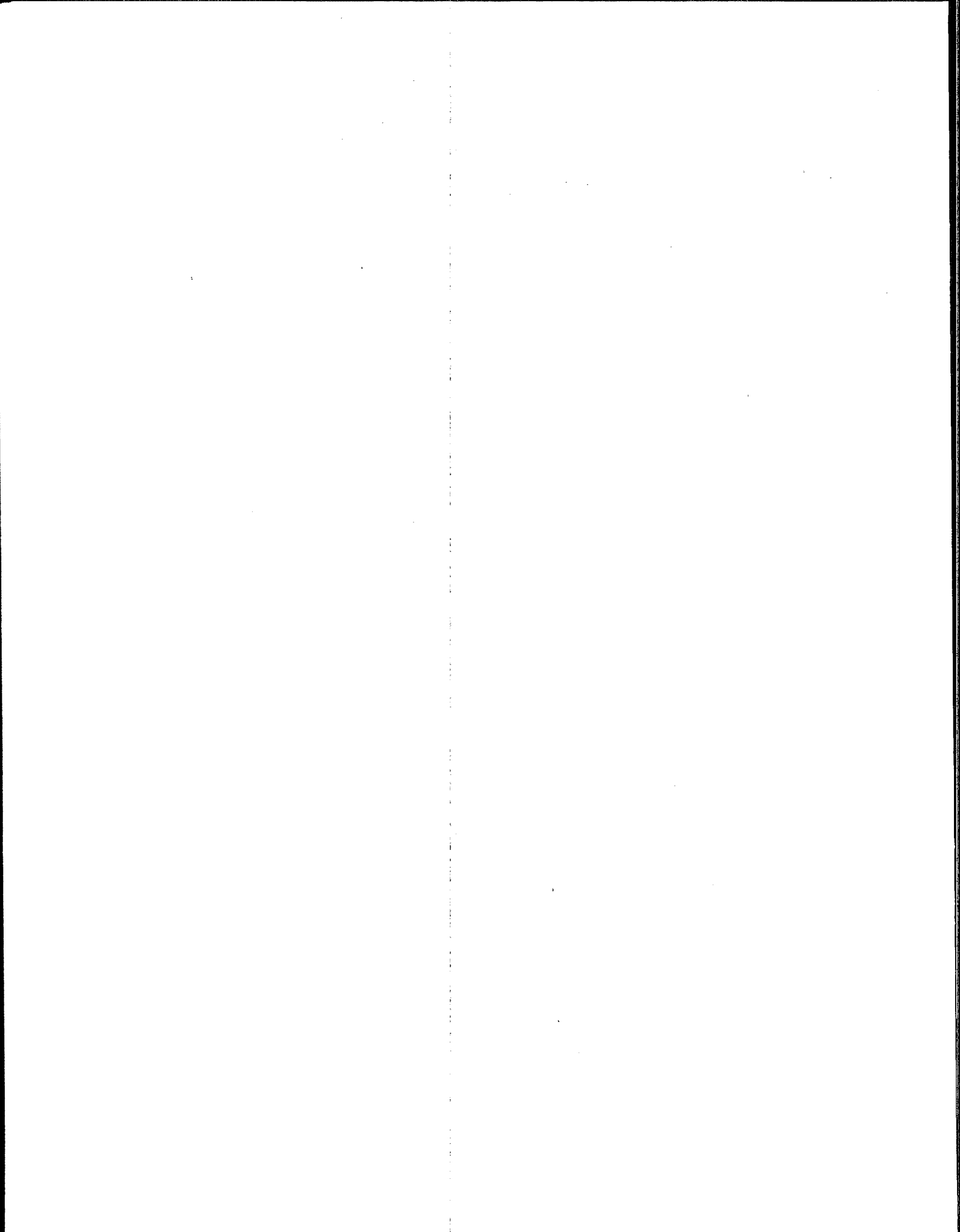


# **National Biennial RCRA Hazardous Waste Report**

**(Based on 1989 Data)**

## **EXECUTIVE SUMMARY**





## EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) collects and maintains information about the generation, management, and disposition of hazardous wastes that are regulated by the Resource Conservation and Recovery Act (RCRA) of 1976, as amended. This Report presents information for 1989. Data from a total of 20,732<sup>1</sup> RCRA hazardous waste sites are included in this Report. Of these, 20,233 were large quantity generators and 3,078 were treatment, storage or disposal (TSD) facilities. Most sites that were TSD facilities were also large quantity generators.

### RCRA HAZARDOUS WASTE GENERATION

#### Quantity Generated and Number of Generators

In 1989, a total of 197.5 million tons<sup>2</sup> of RCRA hazardous waste was generated nationwide by 20,233 large quantity generators. A small number of sites accounted for most of the quantity. The largest 1 percent of sites generated nearly 97 percent of the hazardous waste. More than three-quarters of all sites generated less than 100 tons of hazardous waste each, together accounting for only 0.2 percent of the nationwide generation. Conversely, only 1.7 percent of the sites generated more than 10,000 tons each, contributing approximately 98 percent to the total U.S. RCRA hazardous waste generation.

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<sup>1</sup> This number includes 19 sites that claimed their data as Confidential Business Information (CBI).

<sup>2</sup> This quantity represents RCRA hazardous wastes that were subsequently managed in units subject to RCRA permitting requirements. RCRA hazardous wastes that were managed exclusively in units exempt from RCRA permitting requirements are excluded from this report. See Chapter 2 for a more detailed discussion. This report does not include the wastes classified as hazardous by the new Toxicity Characteristic Leaching Procedure (TCLP) rule adopted in 1990.

Among the States<sup>3</sup>, New Jersey reported the largest amount generated during 1989. Its total generation of 47.1 million tons, or 23.8 percent of the national total, was followed by Michigan with 35.1 million tons, Tennessee with 34.4 million tons, Texas with 28.2 million tons, and West Virginia with 14.4 million tons. Twenty-two of the 55 States each reported generating less than 100,000 tons of RCRA hazardous waste, together representing only 0.2 percent of the nationwide total (see Exhibit 1). California reported the largest number of generators with 2,387, or 11.8 percent of the national total, followed by Texas with 1,575, New Jersey with 1,434, and Illinois with 1,425.

#### Quantity Generated by Industrial Sector

Industries in the manufacturing sector accounted for the majority of the number of RCRA hazardous waste generators and the quantity of RCRA hazardous waste. Manufacturing sites, designated by two-digit Standard Industrial Classification (SIC) codes 20 through 39, made up 58 percent of generators and accounted for almost 98 percent of the hazardous waste quantity. Within the manufacturing sector, the chemicals and allied products industry (two-digit SIC code 28) generated, by far, the largest quantity of hazardous waste, accounting for 88 percent of the total generation for the United States.

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<sup>3</sup> The term "State" includes the District of Columbia, Puerto Rico, Guam, the Trust Territories, and the Virgin Islands.

**Exhibit 1. RCRA Hazardous Waste Generation, Number of Generators, Hazardous Waste Management, Number of TSD Facilities, Imports and Exports, by State, 1989**

STATE	TOTAL GENERATED (tons)	NUMBER OF GENERATORS	TOTAL MANAGED (tons)	NUMBER OF TSD FACILITIES	QUANTITY IMPORTED (tons)	QUANTITY EXPORTED (tons)
ALABAMA	403,701	224	564,189	71	333,661	157,501
ALASKA	3,664	43	29	20	0	3,470
ARIZONA	124,595	175	95,737	17	778	23,415
ARKANSAS	805,150	51	824,156	24	115,352	99,014
CALIFORNIA	4,670,579	2,387	4,978,478	357	28,556	204,896
COLORADO	117,347	131	81,292	59	1,984	33,044
CONNECTICUT	1,390,314	506	366,215	131	21,253	108,501
DELAWARE	19,766	59	3,472	7	1	14,084
DISTRICT OF COLUMBIA	2,357	11	0	0	0	2,409
FLORIDA	411,832	368	359,733	22	16,617	60,915
GEORGIA	2,615,210	378	2,551,209	57	18,188	89,459
GUAM	573	10	0	1	0	203
HAWAII	2,149	28	803	22	149	1,449
IDaho	15,062	20	45,951	9	37,524	1,579
ILLINOIS	1,381,799	1,425	1,441,365	139	285,886	244,472
INDIANA	1,843,015	697	2,021,016	44	313,484	132,313
IOWA	76,240	131	74,653	30	2,330	21,402
KANSAS	1,713,963	192	1,700,795	34	26,167	40,820
KENTUCKY	149,612	337	145,481	51	92,282	66,109
LOUISIANA	9,094,768	445	9,205,887	46	238,750	150,058
MAINE	52,528	46	0	4	0	52,635
MARYLAND	265,227	385	211,256	37	7,731	68,913
MASSACHUSETTS	34,142	494	0	0	0	25,444
MICHIGAN	35,143,264	824	35,067,217	232	199,634	227,860
MINNESOTA	239,098	241	348,586	237	12,581	38,805
MISSISSIPPI	717,291	153	697,961	31	18,649	43,415
MISSOURI	384,289	298	289,531	74	96,944	105,154
MONTANA	4,978	28	2,857	9	0	2,497
NEBRASKA	72,209	72	83,959	12	19,115	8,374
NEVADA	4,685	32	20,246	11	15,142	1,954
NEW HAMPSHIRE	18,211	111	5,952	6	211	13,100
NEW JERSEY	47,096,658	1,434	46,931,754	98	165,933	218,015
NEW MEXICO	10,961	46	6,355	19	16	5,252
NEW YORK	406,910	848	419,838	73	141,488	149,938
NORTH CAROLINA	586,338	684	565,799	28	36,168	43,530
NORTH DAKOTA	28,840	17	25,451	6	660	3,651
OHIO	2,727,383	1,176	2,710,118	161	402,061	326,339
OKLAHOMA	205,382	140	228,363	48	113,781	47,713
OREGON	27,954	77	65,285	13	57,330	18,817
PENNSYLVANIA	1,246,706	1,004	1,139,446	157	356,702	426,113
PUERTO RICO	246,161	76	243,417	38	6	8,636
RHODE ISLAND	5,565	191	12,897	4	13,707	5,201
SOUTH CAROLINA	106,224	394	175,807	34	151,652	38,535
SOUTH DAKOTA	1,088	12	0	2	122	1,372
TENNESSEE	34,363,940	446	34,533,270	67	67,541	41,335
TEXAS	28,171,860	1,575	27,788,963	304	189,576	298,396
TRUST TERRITORIES	23	2	2	2	2	24
UTAH	211,563	85	258,227	34	46,639	6,505
VERMONT	13,481	42	106	6	100	13,840
VIRGIN ISLANDS	5,757	1	5,757	1	0	0
VIRGINIA	5,227,092	287	5,324,021	52	53,109	40,988
WASHINGTON	228,323	714	170,943	56	15,501	57,476
WEST VIRGINIA	14,390,206	102	14,335,403	19	1,774	63,767
WISCONSIN	411,897	559	371,333	55	23,387	111,190
WYOMING	3,180	19	287	7	0	2,954
<b>TOTAL</b>	<b>197,501,112</b>	<b>20,233</b>	<b>196,500,866</b>	<b>3,078</b>	<b>3,740,225</b>	<b>3,972,853</b>

<sup>1</sup> Quantity managed only by storage is excluded

NOTE: Columns may not sum due to rounding.

### Types of Hazardous Waste Generated

Approximately 95 percent of the RCRA hazardous waste reported was wastewater, a substantial portion of which was classified as hazardous due to the "mixture"<sup>4</sup> and "derived-from"<sup>5</sup> rules. These wastes were typically characterized by multiple "listed"<sup>6</sup> EPA waste codes. The most common characteristic waste code reported was D002, indicating corrosivity.

## **RCRA HAZARDOUS WASTE MANAGEMENT**

### Quantity Managed and Number of TSD Facilities

In 1989, a total of 3,078 TSD facilities reported the management of 196.5 million tons of RCRA hazardous waste in units subject to RCRA permitting requirements. As with hazardous waste generation, a few sites accounted for most of the hazardous waste managed. The three largest hazardous waste TSD facilities accounted for 57 percent of the total RCRA hazardous waste management quantity, while the 50 largest TSD facilities accounted for more than 90 percent of the total. Ninety-six percent of the hazardous waste generated was managed on site, while four percent of the RCRA hazardous waste was shipped off site for management.

Among the States, the 5 largest generators were also the largest managers of RCRA hazardous waste. During 1989, New Jersey managed 46.9 million tons, or 23.9 percent of the national total, followed by Michigan with 35.1 million tons, Tennessee with 34.5 million tons, Texas with 27.8 million tons, and West Virginia with 14.3 million tons (see Exhibit 1).

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<sup>4</sup> The mixture rule states that a waste must be managed as hazardous if it is a mixture of solid waste and one or more listed hazardous wastes that have not been delisted.

<sup>5</sup> The derived-from rule states that any solid waste generated from the treatment, storage, or disposal of a listed hazardous waste, including any sludge, spill residue, ash, emission control dust, or leachate remains a hazardous waste unless and until delisted.

<sup>6</sup> They bear EPA waste codes beginning with the letters F, P, U, or K.

California reported the largest number of TSD facilities with 357, followed by Texas with 304 facilities. Nationally, 58 percent of the TSD facilities only stored hazardous waste on site but did not treat or dispose of hazardous waste in units subject to RCRA permitting requirements.

The 60 largest TSD facilities in the nation managed 93.3 percent of the hazardous waste. At these facilities, 14.6 percent of the waste managed was characteristic waste, 36.0 percent was listed waste, and 49.4 percent was both characteristic and listed waste. These percentages closely match those for national hazardous waste generation.

Forty of the 60 largest TSD facilities were in the chemicals and allied products industry (two-digit SIC Code 28). This industry accounted for 172.2 million tons, or 87.6 percent of the total quantity of RCRA hazardous waste managed nationwide. Other industries included among the 60 largest facilities were the petrochemicals and coal products industry (two-digit SIC Code 29), the electronic and other electric equipment industry (two-digit SIC Code 36), the fabricated metal products industry (two-digit SIC Code 34), the primary metals industry (two-digit SIC Code 33), and the electric, gas, and sanitary services industry (two-digit SIC Code 49).

#### Hazardous Waste Management Methods

In terms of the quantity of hazardous waste managed, the predominant waste management method was the biological, physical, or chemical treatment of wastewater, accounting for 76 percent of the total. The management method that ranked second in quantity of waste managed was underground injection wells (14%), another disposal method for wastewater. Approximately 2.3 million tons, or 1.2 percent of the total quantity, was disposed in 86 landfill facilities, while 1.3 million tons or 0.7 percent of the total quantity was incinerated<sup>7</sup> at 221 facilities.

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<sup>7</sup> Incineration includes those quantities of waste that are treated by incinerators with RCRA permits. Incineration does not include fuel blending or energy recovery, the two other treatment categories associated with thermal combustion about which the biennial report collects data.

Exhibit 2 shows the quantities of RCRA hazardous wastes landfilled, incinerated, or injected into underground wells, in each State. The remainder was disposed of by other methods or recycled.

A total of nearly 8 million tons of RCRA hazardous waste was shipped off site for management at 484 TSD facilities. The largest portion of this quantity was disposed of in landfills, accounting for more than one-fourth of the total.

## **INTERSTATE HAZARDOUS WASTE MOVEMENT**

Approximately 8 million tons, or 4 percent of the RCRA hazardous waste generated in the United States in 1989, was shipped off site for management. One-half of this total quantity, or 4 million tons, was transported to a different State for management, while the balance was managed in the same State in which it was generated. Exhibit 1 shows that Ohio imported more waste than any other State, roughly 402,000 tons. Pennsylvania was the leading exporter, sending more than 426,000 tons to other States for management.

Of the 55 States, 17 were net importers of RCRA hazardous waste, 37 were net exporters, and 1 State, the Virgin Islands, neither imported nor exported waste. (A State is a net importer if the total imports were greater than total exports.) The largest net importer of RCRA hazardous waste was Indiana, with net imports of approximately 181,000 tons. California was the largest net exporter, shipping approximately 176,000 tons more hazardous waste out of State than it received.

**Exhibit 2. Quantity of RCRA Hazardous Waste Landfilled, Incinerated, or Injected into Underground Wells, 1989**

STATE	QUANTITY LANDFILLED (tons)	QUANTITY INCINERATED (tons)	QUANTITY INJECTED INTO UNDERGROUND WELLS (tons)
ALABAMA	353,580	4,122	0
ALASKA	0	0	0
ARIZONA	262	266	0
ARKANSAS	188	35,578	681,490
CALIFORNIA <sup>1</sup>	2,167	57,645	0
COLORADO	213	111	0
CONNECTICUT	261	5254	0
DELAWARE	0	888	0
DISTRICT OF COLUMBIA	0	0	0
FLORIDA	0	0	320,134
GEORGIA	0	11,779	0
GUAM	0	0	0
HAWAII	0	1	0
IDAHO	0	2	0
ILLINOIS	172,641	28,668	487,527
INDIANA	330,758	35,358	945,336
IOWA	0	3,014	0
KANSAS	4	3,100	1,666,025
KENTUCKY	0	1,256	0
LOUISIANA	266,640	113,607	8,278,900
MAINE	0	0	0
MARYLAND	0	6,261	0
MASSACHUSETTS	0	0	0
MICHIGAN	200,175	28,102	60,405
MINNESOTA	27	3,886	0
MISSISSIPPI	3,367	78	342,473
MISSOURI	5700	69,003	0
MONTANA	0	0	0
NEBRASKA	0	0	0
NEVADA	15,760	100	0
NEW HAMPSHIRE	0	0	0
NEW JERSEY	167	359	0
NEW MEXICO	0	10	0
NEW YORK	277,156	43,916	0
NORTH CAROLINA	0	0	0
NORTH DAKOTA	7	441	0
OHIO	3,643	176,810	1,330,688
OKLAHOMA	63,206	898	64,703
OREGON	25	26	0
PENNSYLVANIA	0	8,881	0
PUERTO RICO	0	38,162	0
RHODE ISLAND	0	0	0
SOUTH CAROLINA	85,878	35,767	0
SOUTH DAKOTA	0	0	0
TENNESSEE	0	0	1,583,784
TEXAS	52,391	521,822	12,194,749
TRUST TERRITORIES	0	0	0
UTAH	40,581	394	0
VERMONT	6	3	0
VIRGIN ISLANDS	0	0	0
VIRGINIA	0	13,288	0
WASHINGTON	14	0	0
WEST VIRGINIA	17,334	28,699	0
WISCONSIN	0	2659	0
WYOMING	0	0	0
CBI <sup>2</sup>	0	0	70
<b>TOTAL</b>	<b>2,275,783</b>	<b>1,280,216</b>	<b>27,956,288</b>

<sup>1</sup> Some sites in these states claimed their data as CBI. The national landfill quantity includes hazardous waste landfilled at the CBI sites. The State quantities do not include hazardous waste landfilled at the CBI sites (Total of 383,632 tons).

<sup>2</sup> To preserve confidentiality, CBI data for underground injection were not incorporated into the State totals.

NOTE: Columns may not sum due to rounding.

## **WASTE MINIMIZATION**

Of the 20,713<sup>8</sup> sites that reported in 1989, 6,067 sites (29 percent) engaged in one or more new waste minimization<sup>9</sup> activities during 1989. These 6,067 sites accounted for 50 percent of the total quantity of RCRA hazardous waste generated in the nation, indicating that many of the largest generators did engage in new waste minimization activities in 1989. Approximately 37 percent of all sites reported conducting an opportunity assessment in 1988 or 1989 to identify practices that could lead to waste minimization.

The sites that engaged in new waste minimization activities during 1989 did so for only some of the hazardous wastes they generated. Nationally, of the 147,295 wastes<sup>10</sup> reported in 1989, only 11,434 wastes, or 8 percent, were targets of a new waste minimization activity. Moreover, these wastes comprised only 8.2 million tons, or 4 percent, of the total quantity of hazardous waste generated. Wastewaters, the largest quantity hazardous wastes, were infrequently the targets of new waste minimization activities.

Approximately 38 percent of the sites in the manufacturing industries (two-digit SIC codes 20 to 39) engaged in new waste minimization activities compared to the national average of 29 percent. Manufacturing sites also reported new waste minimization activities on individual

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<sup>8</sup> Waste minimization data from 19 CBI sites were not included in the analyses.

<sup>9</sup> Waste minimization refers to source reduction and/or recycling.

<sup>10</sup> A site required to submit the 1989 Hazardous Waste Report completed a Form GM if it generated or shipped any quantity of RCRA hazardous waste during 1989.

A complete, separate, and independent Form GM was submitted for each RCRA hazardous waste:

- generated on site during 1989 from production processes or service activities;
- shipped off site during 1989 that was received from off site and had not been recycled, blended, or otherwise treated on site; or,
- residual generated during 1989 from the on-site treatment, disposal, or recycling of wastes.

wastes almost twice as frequently as did sites outside that sector (9.5 percent of individual wastes minimized, versus 5.1 percent).

Of all waste minimization activities reported, 90 percent of them involved source reduction, compared to only 16 percent that involved recycling (6% involved both source reduction and recycling). The most common source reduction activities were process modifications and good operating practices, cited by 34 percent and 33 percent of the sites, respectively.<sup>11</sup> The most common wastes that were subjected to waste minimization (by source reduction or recycling) during 1989 were ignitable wastes (EPA waste code D001) and solvents (EPA waste codes F001, F002, F003, F005). The most commonly reported factors limiting the sites from initiating new waste minimization activities were economic infeasibility (the cost savings in waste management or production would not recover the capital investment), lack of technical information, and concerns that product quality would decline. Permitting burdens were cited infrequently as a reason for not initiating new waste minimization activities.

## **COMPARISON TO 1987 HAZARDOUS WASTE ACTIVITIES**

### **Quantity Generated and Number of Generators**

The quantity of RCRA hazardous waste generated in the United States declined from 238.3 million tons in 1987 to 197.5 million tons in 1989, a reduction of 17 percent. This decrease was largely the result of shifts in the management of wastewaters from surface impoundments that were subject to RCRA permitting requirements to tanks that were exempt from those requirements. The number of large quantity generators reported in 1989 (20,233), was 14 percent higher than that reported in 1987 (17,677). Nearly all the increase in the number of

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<sup>11</sup> Examples of process modifications include better control on operating conditions, change from solvents to aqueous cleaners, and closed-loop recycling. Examples of good operating practices include improved maintenance scheduling, segregation of hazardous waste from non-hazardous waste, and segregation of recyclable waste from non-recyclable waste.

generators was among sites that generated fewer than 13 tons. The number of sites that reported generating more than 13 tons was about the same in 1987 and 1989.

A comparison of the individual sites reporting as large quantity generators in 1987 and 1989 finds that only 52 percent of the generators in 1989 also reported in 1987. However, the sites that reported in both years accounted for approximately 98 percent of the total quantity of waste generated in both 1987 and 1989. Among larger generators (those that generated more than 100 tons in either year), approximately 84 percent of the sites reporting in 1987 also reported in 1989. Larger generators also appear to report consistently over the years, while many of the smaller large quantity generators appear to meet reporting thresholds only once or in occasional years.

#### Quantity Managed and Number of TSD Facilities

The quantity of RCRA hazardous waste managed in units subject to RCRA permitting requirements decreased by 16 percent, from 233.5 million tons in 1987 to 196.5 million tons in 1989. Most of the decrease resulted not from changes in the quantity of waste produced, but rather from a change in waste management practices. A number of larger sites that had managed wastewaters in surface impoundments subject to RCRA permitting requirements have converted to tank management that is exempt from RCRA permitting requirements. The number of TSD facilities reporting decreased from 3,308 in 1987 to 3,078 in 1989, a decline of 7 percent.

#### Hazardous Waste Imports and Exports

Approximately 4 million tons of hazardous waste were shipped to another State for management in 1989, compared to 3.6 million tons in 1987, an increase of 10 percent.

